

Transformational Leadership and Tuberculosis Control Performance: Mediating Roles of Well-Being and Motivation

Dedi Ari Saputro¹⁾, Setyo Sri Rahardjo^{1,3)}, Revi Gama Hatta Novika^{1,2)}, Anik Lestari^{1,4)}, Eti Poncorini Pamungkasari^{1,4)}

¹⁾Master's Program in Public Health, Faculty of Medicine, Sebelas Maret University, Indonesia

²⁾Midwifery Study Program, Faculty of Medicine, Sebelas Maret University, Indonesia

³⁾Department of Pharmacology, Faculty of Medicine, Sebelas Maret University, Indonesia

⁴⁾Department of Public Health, Faculty of Medicine, Sebelas Maret University, Indonesia

Received: March 4, 2026; Accepted: April 3, 2026; Available online: May 16, 2026

ABSTRACT

Background: Tuberculosis control requires optimal performance from healthcare workers. Psychosocial factors such as transformational leadership, subjective well-being, and work motivation are believed to play a role in enhancing this performance. This study aims to analyze the effects of transformational leadership and subjective well-being on the performance of healthcare workers in TB control, as well as to examine the role of work motivation as a mediating variable.

Subjects and Method: This study employed a cross-sectional design with a sample of 265 health workers at nine community health centers in Sragen Regency, selected using purposive sampling. The independent variables included transformational leadership and subjective well-being; the dependent variable was health worker performance; and work motivation served as the mediating variable. The data were analyzed using path analysis.

Results: The results of the study indicate that work motivation has a positive and significant effect on the performance of healthcare workers ($b = 1.04$; 95% CI 0.63 to 1.45; $p < 0.001$). Transformational leadership also has a positive and significant effect on performance ($b = 0.36$; 95% CI 0.14 to 0.57; $p = 0.001$), while subjective well-being has a positive but not significant effect ($b = 0.21$; 95% CI -0.02 to 0.43; $p = 0.075$). Transformational leadership ($b = 0.18$; 95% CI 0.11 to 0.24; $p < 0.001$) and subjective well-being ($b = .38$; 95% CI 0.33 to 0.42; $p < 0.001$) have a significant effect on work motivation. Furthermore, work motivation significantly mediated the effects of transformational leadership ($b = 0.19$; 95% CI 0.10 to 0.27; $p < 0.001$) and subjective well-being ($b = 0.39$; 95% CI 0.23 to 0.56; $p < 0.001$) on healthcare workers' performance.

Conclusion: Work motivation and transformational leadership significantly influence healthcare workers' performance in tuberculosis control, with work motivation serving as the primary mediator linking transformational leadership and subjective well-being to performance.

Keywords: subjective well-being, transformational leadership, tuberculosis, motivation

Correspondence:

Setyo Sri Rahardjo. Master's Program in Public Health, Universitas Sebelas Maret. Jl. Ir. Sutami 36A, Surakarta, Central Java 57126, Indonesia. Email: setyosri@staff.uns.ac.id.

Cite this as:

Saputro DA, Rahardjo SS, Novika RGH, Lestari A, Pamungkasari EP (2026). Transformational Leadership and Tuberculosis Control Performance: Mediating Roles of Well-Being and Motivation. *Health Policy Manage*, 11(02): 196-206. <https://doi.org/10.26911/thejhp.2026.11.02.08>.



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BACKGROUND

Tuberculosis (TB) remains a major global public health problem, particularly in high-burden countries such as Indonesia. Indonesia is among the countries with the highest TB burden and underreporting rates worldwide, with more than one million cases and hundreds of thousands of deaths annually. The COVID-19 pandemic also disrupted TB control efforts and reduced case notification and treatment coverage in many regions (Caren et al., 2022; Saputra et al., 2025; Surendra et al., 2023a; Surendra et al., 2023b).

According to the World Health Organization, approximately 10.8 million TB cases were reported globally in 2023, with most cases occurring in high-burden countries including India, Indonesia, China, the Philippines, and Pakistan. Indonesia ranks as the second highest TB-burden country after India, with an estimated 1.09 million new cases and nearly 125,000 TB-related deaths annually (WHO, 2024). In Central Java Province, TB prevalence remains relatively high, with a case detection rate of 90.5% and 87,706 identified cases in 2024. Meanwhile, Sragen Regency recorded approximately 1,593 TB cases with a case detection rate of 74.1%, indicating ongoing challenges in early detection and continuity of treatment services (Ministry of Health Indonesia, 2024).

The burden of TB in Indonesia is further complicated by delayed diagnosis, regional disparities, and environmental and socioeconomic risk factors such as poor housing conditions, malnutrition, low educational attainment, and comorbidities (Fahdhienie et al., 2024; Lestari et al., 2020; Noviyani et al., 2021). Therefore, national TB strategies emphasize early detection, drug-resistant TB management, contact investigation, and community empowerment (Lestari et al., 2023; Suryanti & Adewale, 2024).

Within the context of these substantial challenges in TB control, healthcare workers'

performance becomes a critical determinant of the effectiveness of TB programs. Previous studies have shown that healthcare workers' knowledge regarding TB, work experience in TB-specific units, and access to technical training significantly influence the quality of TB services. Evidence from Ethiopia demonstrated that healthcare workers with better TB-related knowledge and direct experience in TB clinics were more likely to implement optimal infection prevention practices (Tadesse et al., 2020; Tiruneh et al., 2023). Higher educational attainment and TB-related training were also found to strengthen healthcare workers' competencies in applying TB control standards in clinical settings (Tadesse et al., 2020; Vigenschow et al., 2021).

In addition to technical competence, psychosocial and organizational factors such as transformational leadership, workload, and work motivation also influence healthcare workers' performance (Tan et al., 2020; Zhou et al., 2024a). Transformational leadership has been found to improve motivation, work engagement, and job satisfaction while reducing emotional exhaustion and work stress (Alruwaili, 2025; Huang et al., 2025). Subjective well-being also contributes positively to employee motivation and performance. Individuals with higher subjective well-being tend to demonstrate greater productivity, confidence, and job satisfaction (Jung et al., 2024; Lestari & Muarifah, 2022). Work motivation itself has consistently been associated with better teamwork, service quality, and healthcare workers' performance (Mutmainah et al., 2023; Ramos-Quispe, 2025).

Despite increasing evidence regarding transformational leadership, subjective well-being, and work motivation, previous studies in Sragen Regency mainly focused on compliance with TB prevention procedures rather than psychological and organizational

determinants of healthcare workers' performance (Mulyawati and Koesyanto, 2023). Therefore, this study aims to examine the effect of transformational leadership and subjective well-being on healthcare workers' performance in TB control programs through work motivation as a mediating variable using path analysis.

SUBJECTS AND METHOD

1. Study Design

This quantitative study employed a cross-sectional design. The study was conducted in February 2026 at nine community health centers in Sragen Regency, Central Java, Indonesia, representing urban areas, northern areas, and southern areas of the Bengawan River. These sites were selected due to the high burden of tuberculosis (TB) cases and the critical role of healthcare workers in TB management.

2. Population and Sample

The study population consisted of 756 healthcare workers, including physicians, nurses, pharmacists, nutritionists, and midwives. A sample of 265 respondents was determined using the Slovin formula with a 5% margin of error. Participants were selected through purposive sampling. The inclusion criteria were doctors, nurses, or TB program officers who had managed TB services for at least six months, while the exclusion criteria included healthcare workers who were on leave, unavailable during data collection, or unwilling to participate in the study.

3. Research Variables

In this study, transformational leadership and subjective well-being are categorized as exogenous variables because they function as independent variables influencing other variables in the model, while motivation is categorized as an endogenous mediating variable because it is influenced by transformational leadership and subjective

well-being and simultaneously affects healthcare workers' performance. Healthcare workers' performance in TB control programs is the final endogenous variable. The path analysis examines the direct effects of motivation, transformational leadership, and subjective well-being on healthcare workers' performance, as well as the indirect effects of transformational leadership and subjective well-being on performance through motivation in Sragen Regency.

4. Operational Definition

Transformational Leadership. Healthcare workers' perceptions of the leadership style of the community health center director, which provides direction, motivation, and support to achieve organizational goals.

Subjective Well-being. Healthcare workers' assessment of their happiness, health, social relationships, and sense of life's meaning.

Work Motivation. The internal and external drivers of healthcare workers in carrying out their tuberculosis control duties.

Healthcare Workers' Performance in Tuberculosis Control. The outcomes of healthcare workers' efforts in tuberculosis programs based on service quality, adherence to guidelines, collaboration, and professional development.

5. Study Instruments

Data were collected using a structured questionnaire with a 4-point Likert scale (1 = strongly disagree to 4 = strongly agree). The instrument measured transformational leadership, subjective well-being, work motivation, and healthcare worker performance in tuberculosis control. Transformational leadership was assessed through vision, inspirational communication, intellectual stimulation, supportive leadership, and personal recognition; subjective well-being through happiness, health, life meaning, social relationships, and financial stability;

work motivation through intrinsic and extrinsic motivation, work engagement, and work environment; and performance through clinical performance, service quality, collaboration, professionalism, and professional development. Construct validity was confirmed using item-rest correlations ≥ 0.30 . Reliability testing showed satisfactory Cronbach's alpha values for transformational leadership (0.90), subjective well-being (0.92), work motivation (0.84), and performance (0.94).

6. Data Analysis

Quantitative analysis included univariate analysis using descriptive statistics (frequency, percentage, mean, and standard deviation) to describe respondent characteristics and research variables. Bivariate analysis was conducted to examine the relationship between independent and dependent variables. Multivariate analysis was performed using path analysis to evaluate direct and indirect effects among transformational leadership, subjective well-being, motivation, and healthcare workers' performance in TB control. In the path model, transformational leadership and subjective well-being acted as exogenous variables, motivation as a mediating variable, and healthcare workers' performance as the endogenous variable. Model fit was evaluated using the Goodness-of-Fit Index (GFI), Adjusted

Goodness-of-Fit Index (AGFI), Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA). All analyses used a significance level of $\alpha = 0.05$ and were processed using STATA 17 software.

7. Research Ethics

The study obtained ethical approval from the Health Research Ethics Committee of Dr. Moewardi General Hospital under Ethical Clearance Number 166/I/HREC/2026. All participants received complete information regarding the study objectives, confidentiality of data, and participant rights, and provided informed consent prior to participation.

RESULTS

1. Sample Characteristics

Table 1 shows that the majority of respondents were female (87.9%), held a diploma or associate's degree (55.1%), had >10 years of work experience (55.1%), and were civil servants (78.5%). The respondents' occupations were dominated by midwives (36.2%) and nurses (27.2%), while the remaining respondents consisted of doctors, sanitation workers, nutritionists, laboratory analysts, pharmacy staff, health promotion staff, pharmacists, dentists, and other health workers. All respondents were from nine community health centers in Sragen Regency with a relatively even distribution.

Table 1. Sample Characteristic

Characteristics	n	%
Gender		
Male	32	12.1
Female	233	87.9
Educational Level		
High School/Vocational High School	4	1.5
Diploma (D3/D4)	146	55.1
Bachelor/Professional Degree	97	36.6
Master's Degree	18	6.8
Length of Employment		
< 5 years	61	23.0
5–10 years	58	21.9
> 10 years	146	55.1

Characteristics	n	%
Employment Status		
Civil Servant (ASN)	208	78.5
Government Employee with Work Agreement (PPPK)	38	14.3
Contract Employee	10	3.8
Honorary Employee	9	3.4
Job Position		
Clinical Professionals	24	9.1
Nursing and Midwifery	168	63.4
Pharmacy Staff	18	6.8
Public Health and Allied Health Staff	47	17.7
Others	8	3.0
Primary Health Care Area		
Urban	95	35.8
Northern rural area	89	33.6
Southern rural area	81	30.6

Table 2 presents the results of the univariate analysis of 265 healthcare workers. The mean scores were as follows: transformational leadership (Mean= 41.15; SD= 4.73), subjective well-being (Mean= 56.50; SD= 5.97), work motivation (Mean=

35.15; SD= 3.37), and healthcare workers' performance in tuberculosis control (Mean= 70.45; SD= 7.83). These results indicate that all study variables tended to fall into the fair to good category prior to further analysis

Table 2. Univariate Analysis of Research Variables

Variables	Mean	SD	Min.	Max.
Transformational Leadership	41.15	4.73	29	52
Subjective Well-Being	56.50	5.97	43	68
Motivation	35.15	3.37	29	44
Performance	70.45	7.83	46	88

2. Bivariate Analysis

Bivariate analysis was conducted to examine the relationship between independent and dependent variables. Table 3 shows that transformational leadership ($b = 0.95$; $p < 0.001$), subjective well-being ($b = 0.83$; p

< 0.001), and work motivation ($b = 1.64$; $p < 0.001$) had positive and significant associations with healthcare workers' performance in tuberculosis control.

Table 3. Bivariate Analysis of Factors Associated with Healthcare Worker Performance in Tuberculosis Control.

Independent Variable	b	95% CI		p
		Lower limit	Upper limit	
Transformational Leadership	0.95	0.77	1.13	<0.001
Subjective Well-Being	0.83	0.69	0.97	<0.001
Work Motivation	1.64	1.43	1.85	<0.001

Table 3 shows that transformational leadership has a positive and significant relationship with the performance of health

workers in tuberculosis control ($b = 0.95$; 95% CI=0.77 to 1.13; $p < 0.001$). Subjective well-

being has a positive and significant relationship with healthcare workers' performance in tuberculosis control ($b=0.83$; 95% CI=0.69 to 0.97; $p<0.001$). Work motivation has a positive and significant relationship with healthcare workers' performance in tuberculosis control ($b=1.64$; 95% CI=1.43 to 1.85; $p<0.001$).

3. Multivariate analysis

Table 4 shows that transformational leadership has a positive and significant effect on the work motivation of healthcare workers ($b=0.18$; 95% CI=0.11 to 0.24; $p<0.001$).

Subjective well-being has a positive and significant effect on the work motivation of healthcare workers ($b=0.38$; 95% CI= 0.33 to 0.42; $p<0.001$).

Work motivation has a positive and significant effect on healthcare workers' performance in tuberculosis control ($b=1.04$; 95% CI=0.63 to 1.45; $p<0.001$).

Transformational leadership has a direct, positive, and significant effect on healthcare workers' performance ($b=0.36$; 95% CI= 0.14 to 0.57; $p=0.001$), as well as an indirect effect through work motivation ($b=0.19$; 95% CI=0.10 to 0.27; $p<0.001$).

Subjective well-being has a positive but non-significant direct effect on healthcare workers' performance ($b=0.21$; 95% CI= -0.02 to 0.43; $p = 0.075$), but it has a significant indirect effect through work motivation ($b = 0.39$; 95% CI = 0.23 to 0.56; $p < 0.001$).

Table 4. Direct and Indirect of Transformational Leadership on Healthcare Worker Performance Through Subjective Well-Being and Work Motivation

Direction of the relationship	b	95% CI		p
		Lower limit	Upper limit	
Direct Effect				
Transformational Leadership → Work Motivation	0.18	0.11	0.24	<0.001
Subjective Well-Being → Work Motivation	0.38	0.33	0.42	<0.001
Work Motivation → TB Control Performance	1.04	0.63	1.45	<0.001
Transformational Leadership → TB Control Performance	0.36	0.14	0.57	0.001
Subjective Well-Being → TB Control Performance	0.21	-0.02	0.43	0.075
Indirect Effect				
Transformational Leadership → Work Motivation → TB Control Performance	0.19	0.10	0.27	<0.001
Subjective Well-Being → Work Motivation → TB Control Performance	0.39	0.23	0.56	<0.001

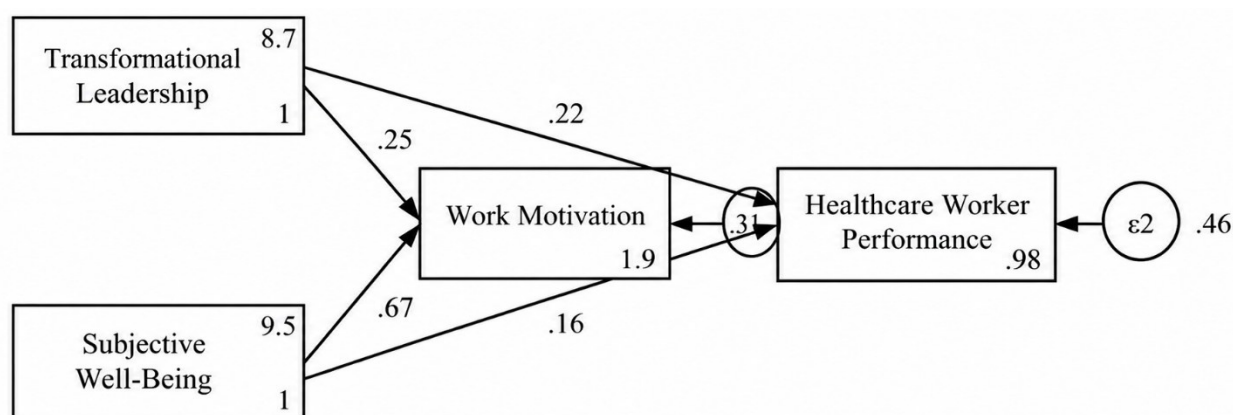


Figure 1. Path Analysis Parameter Estimates

DISCUSSION

The results showed that work motivation had a positive and significant effect on healthcare workers' performance in tuberculosis (TB) control. This finding indicates that healthcare workers with higher motivation tend to demonstrate better performance in implementing TB programs, including case detection, treatment monitoring, patient adherence supervision, and health promotion activities. Previous studies also reported that work motivation is an important determinant of healthcare workers' performance in public health services and infectious disease control programs (Colvin et al., 2021; Kukurika & Iurovskaia, 2022). Conversely, high workload, limited training opportunities, and lack of professional development may reduce motivation and negatively affect TB program outcomes (Singh et al., 2025; Wang et al., 2024; Zhou et al., 2024).

Transformational leadership was also found to have a positive and significant effect on healthcare workers' performance. Leaders who are able to inspire, motivate, and provide clear direction can strengthen healthcare workers' engagement and commitment in achieving organizational goals, including TB control targets. This finding supports transformational leadership theory, which emphasizes inspiration, individualized considera-

tion, and intellectual stimulation as mechanisms to improve employee performance. Previous studies similarly demonstrated that transformational leadership positively affects healthcare workers' job satisfaction, organizational commitment, and service performance in healthcare settings (Hundie & Habtewold, 2024; Singh et al., 2025).

Subjective well-being showed a positive but non-significant direct effect on healthcare workers' performance. Although the relationship was not statistically significant, healthcare workers with better psychological well-being generally experience lower stress, greater work enthusiasm, and stronger commitment to their duties. Subjective well-being reflects life satisfaction, positive emotions, and perceived quality of life, which may influence work engagement and service quality. Previous studies also reported that subjective well-being is associated with productivity, organizational commitment, and healthcare service quality, although its effect on performance is often indirect through work motivation or job satisfaction (Voukelatou et al., 2021).

The analysis further demonstrated that work motivation mediated the relationship between transformational leadership and healthcare workers' performance. This finding suggests that transformational leaders not only directly improve performance, but also

indirectly enhance performance by increasing healthcare workers' motivation. Leaders who provide support, recognition, empowerment, and clear communication can strengthen intrinsic motivation, resulting in higher work engagement and improved performance outcomes in TB control activities (Abu-Qutaish et al., 2025; Huang et al., 2025).

Work motivation also mediated the relationship between subjective well-being and healthcare workers' performance. Healthcare workers with better psychological well-being are more likely to feel motivated, engaged, and committed to their work responsibilities. Organizational support, psychosocial support systems, and performance-based incentives may strengthen healthcare workers' motivation and reduce burnout, thereby improving performance in healthcare services and TB control programs (Hennein et al., 2022; Li et al., 2025). Interventions such as mindfulness, workload management, and supportive work environments have also been shown to improve psychological well-being and work engagement among healthcare workers (Cohen et al., 2023; Desai et al., 2021; Kohnen et al., 2023).

This study has several strengths, including the use of path analysis to simultaneously evaluate direct and indirect relationships among variables, allowing a more comprehensive understanding of factors affecting healthcare workers' performance in TB control. However, several limitations should also be considered. The cross-sectional design limits causal interpretation because the relationships identified only reflect associations at one point in time. In addition, the use of self-administered questionnaires may introduce response bias, and other unmeasured factors such as workload, organizational culture, and work environment may also influence healthcare workers' performance. Furthermore, the findings may have limited generalizability because the

study was conducted only among healthcare workers involved in TB control programs.

This study shows that work motivation and transformational leadership have a positive and significant effect on the performance of healthcare workers in tuberculosis control in Sragen, while subjective well-being shows a positive effect but is not yet statistically significant. In addition, work motivation was found to act as a mediating variable that strengthens the influence of transformational leadership and subjective well-being on the performance of healthcare workers. These findings underscore the importance of strengthening work motivation through the implementation of transformational leadership, organizational support, and improved psychological well-being of healthcare workers to enhance the effectiveness of TB control programs. Therefore, the results of this study are expected to serve as a foundation for the Health Office, healthcare workers, and future researchers in developing strategies to improve healthcare worker performance in public health programs.

AUTHOR CONTRIBUTION

All author actively participated in all stages of the study, including study design, data collection, data analysis, and manuscript preparation.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest whatsoever related to this research.

FUNDING AND SPONSORSHIP

This study was self-funded.

ACKNOWLEDGEMENT

The authors would like to express gratitude to the District Health Office of Sragen, Central Java, Indonesia, for their support in this research. The authors also extend the appreciation to all healthcare workers involved in

the tuberculosis control program who willingly participated in the survey and contributed valuable information throughout the research process. The support and cooperation of all parties greatly contributed to the successful completion of this research.

REFERENCES

- Abu-Qutaish R, Alostha MR, Abu-Shosha G, Oweidat IA, Nashwan AJ (2025). The relationship between transformational leadership, work motivation, and engagement among nurses in Jordanian governmental hospitals. *BMC Nurs.* 24(1):842. doi: 10.1186/s12912-025-03518-7.
- Alruwaili AN (2025). Transformational nurse leaders and nurse well-being: Examining mediating influences of organizational justice and quality of work life mixed methods study. *J Nurs Manag.* 2025(1):1–5. doi: 10.1155/jonm/45773-50.
- Caren GJ, Iskandar D, Pitaloka DA, Abdulah R, Suwantika AA (2022). COVID-19 pandemic disruption on the management of tuberculosis treatment in Indonesia. *J Multidiscip Healthc.* 15:175–183. doi: 10.2147/JMDH.S341130.
- Cohen C, Pignata S, Bezak E, Tie M, Childs J (2023). Workplace interventions to improve well-being and reduce burnout for nurses, physicians and allied healthcare professionals: A systematic review. *BMJ Open.* 13(6):e071203. doi: 10.1136/bmj-open-2022-071203.
- Colvin CJ, Hodgins S, Perry HB (2021). Community health workers at the dawn of a new era: Incentives and remuneration. *Health Res Policy Syst.* 19(S3):106. doi: 10.1186/s12961-021-00750-w.
- Desai ND, Chavda P, Shah S (2021). Prevalence and predictors of suicide ideation among undergraduate medical students from a medical college of Western India. *Med J Armed Forces India.* 77:S107–S114. doi: 10.1016/j.mjafi.2020.11.018.
- Fahdhienie F, Mudatsir M, Abidin TF, Nurjannah N (2024). Risk factors of pulmonary tuberculosis in Indonesia: A case-control study in a high disease prevalence region. *Narra J.* 4(2):1–5. doi: 10.52225/narra.v4i2.943.
- Hennein R, Ggita JM, Turimumahoro P, Ochom E, Gupta AJ, Katamba A, Armstrong-Hough M, et al. (2022). Core components of a community of practice to improve community health worker performance: A qualitative study. *Implement Sci Commun.* 3(1):27. doi: 10.1186/s43058-022-00279-1.
- Huang Q, Wang L, Huang H, Tang H, Liu J, Chen C (2025). Transformational leadership, psychological empowerment, work engagement and intensive care nurses' job performance: A cross-sectional study using structural equation modeling. *BMC Nurs.* 24(1):1025. doi: 10.1186/s12912-025-03685-7.
- Hundie Z, Habtewold E (2024). The effect of transformational, transactional, and laissez-faire leadership styles on employees' level of performance: The case of hospital in Oromia Region, Ethiopia. *J Healthc Leadersh.* 16:67–82. doi: 10.2147/JHL.S450077.
- Jung S, Han K, Kim K (2024). Individual-level positive psychological capital that enhances managers' transformational leadership effectiveness on nurse career success. *Int Nurs Rev.* 71(4):977–984. doi: 10.1111/inr.12958.
- Kohnen D, De Witte H, Schaufeli WB, Dello S, Bruyneel L, Sermeus W (2023). What makes nurses flourish at work? How the perceived clinical work environment relates to nurse motivation and well-being: A cross-sectional study. *Int J Nurs Stud.* 148:104567. doi: 10.1016/j.ijnurstu.2023.104567.

- Kukurika AV, Iurovskaia EI (2022). Hierarchy of labor motives of different professional groups of employees of medical institutions. *Res Pract Med J*. 9(3):171–179. doi: 10.17709/2410-1893-2022-9-3-13.
- Lestari BW, McAllister S, Hadisoemarto PF, Afifah N, Jani ID, Murray M, van Crevel R, et al. (2020). Patient pathways and delays to diagnosis and treatment of tuberculosis in an urban setting in Indonesia. *Lancet Reg Health West Pac*. 5:100059. doi: 10.1016/j.lanwpc.2020.-100059.
- Lestari SS, Muarifah A (2022). Work motivation and self-efficacy: Building subjective well-being teacher Raudhatul Athfal. *Al-Athfal Jurnal Pendidikan Anak*. 8(1):49–60. doi: 10.14421/al-athfal.2022.81-05.
- Lestari T, Fuady A, Yani FF, Putra IWGAE, Pradipta IS, Chaidir L, Handayani D, et al. (2023). The development of the national tuberculosis research priority in Indonesia: A comprehensive mixed-method approach. *PLoS One*. 18(2): e0281591. doi: 10.1371/journal.pone.0281591.
- Li R, Zhu J, Li R, Wang X, Tian T, Wan B (2025). Developmental trajectories of balance performance in preschoolers: Age and gender differences for 3–6 years old Chinese children. *Front Physiol*. 16:1615581. doi: 10.3389/fphys.2025.1615581.
- Ministry of Health of the Republic of Indonesia (2024). Report of the Indonesian Tuberculosis Inventory Study. Jakarta: Ministry of Health of the Republic of Indonesia
- Mulyawati SD, Koesyanto H (2023). Kepatuhan penggunaan alat pelindung diri (APD) pada tenaga kesehatan (Compliance with Personal Protective Equipment (PPE) Use among Healthcare Workers). *Indones J Public Health Nutr*. 3(2):270–277. doi: 10.15294/ijp-hn.v3i2.59159.
- Mutmainah M, Vanchapo AR, Lewar ESB, Tusi JS, Wang Y, Zou G (2023). Relationship between work motivation and health worker performance at Kronjo Health Center. *J World Future Med Health Nurs*. 1(2):102–113. doi: 10.55849/health.v1i2.450.
- Noviyani A, Nopsopon T, Pongpirul K (2021). Variation of tuberculosis prevalence across diagnostic approaches and geographical areas of Indonesia. *PLoS One*. 16(10):e0258809. doi: 10.1371/journal.pone.0258809.
- Ramos Quispe MR (2025). Job motivation and its relationship with work performance in a public health sector entity, Lima–2022. *Bol Coyuntura*. 46:18–25. doi: 10.31243/bcoyu.46.2025.2866.
- Saputra A, Wichaidit W, Kesuma ZM, Chongsuvivatwong V (2025). Spatio-temporal distribution of COVID-19 cases and tuberculosis in four provinces of Sumatra Islands, Indonesia. *BMC Public Health*. 25(1):529. doi: 10.1186/s12889-025-21754-z.
- Singh V, Chandwani R, Pingali V, Dalal A (2025). Frontline workers in India's tuberculosis elimination efforts: A street-level bureaucracy perspective. *BMC Public Health*. 25(1):4412. doi: 10.1186/s12889-025-25431-z.
- Surendra H, Elyazar IRF, Puspaningrum E, Darmawan D, Pakasi TT, Lukitosari E, Sulistyo S, et al. (2023a). Impact of the COVID-19 pandemic on tuberculosis control in Indonesia: A nationwide longitudinal analysis of programme data. *Lancet Glob Health*. 11(9):e1392–e1401. doi: 10.1016/S2214-109X(23)-00312-1.
- Surendra H, Paramita D, Arista N, Putri A, Siregar A, Puspaningrum E, Rosylin L, et al. (2023b). Geographical variations

- and district-level factors associated with COVID-19 mortality in Indonesia: A nationwide ecological study. *BMC Public Health*. 23:15015. doi: 10.1186/s12889-023-15015-0.
- Suryanti, Adewale AI (2024). A review of tuberculosis burden and under-notification in Indonesia: A scoping review. *Int J Chem Biochem Sci*. 26(20):1–5. doi: 10.62877/5-IJCBS-24-26-20-5.
- Tadesse AW, Alagaw A, Kassa M, Bekele M (2020). Tuberculosis infection control practices and associated factors among healthcare workers in hospitals of Gamo Gofa Zone, Southern Ethiopia: Institution-based cross-sectional study. *PLoS One*. 15(9):e0239159. doi: 10.1371/journal.pone.0239159.
- Tan C, Kallon II, Colvin CJ, Grant AD (2020). Barriers and facilitators of tuberculosis infection prevention and control in low- and middle-income countries from the perspective of healthcare workers: A systematic review. *PLoS One*. 15(10):e0241039. doi: 10.1371/journal.pone.0241039.
- Tiruneh MG, Fenta ET, Anagaw TF, Bogale EK, Delie AM (2023). Tuberculosis infection control practice and associated factors among healthcare workers in Ethiopia: Systematic review and meta-analysis. *PLoS One*. 18(12):e0295555. doi: 10.1371/journal.pone.0295555.
- Vigenschow A, Edoa JR, Adegbite BR, Agbo PA, Adegnika AA, Alabi A, Massinga-Loembe M, et al. (2021). Knowledge, attitudes and practices regarding tuberculosis amongst healthcare workers in Moyen-Ogooué Province, Gabon. *BMC Infect Dis*. 21(1):486. doi: 10.1186/s12879-021-06225-1.
- Voukelatou V, Gabrielli L, Miliou I, Cresci S, Sharma R, Tesconi M, Pappalardo L (2021). Measuring objective and subjective well-being: Dimensions and data sources. *Int J Data Sci Anal*. 11(4):279–309. doi: 10.1007/s41060-020-00224-2.
- Wang G, Yuan Q, Feng X, Zhang T, Wang Q, Huang Q, Liu S, et al. (2024). The job burnout of tuberculosis healthcare workers and associated factors under integrated tuberculosis control model: A mixed-method study based on the two-factor theory. *BMC Health Serv Res*. 24(1):984. doi: 10.1186/s12913-024-11472-4.
- Wang X, Cheng Z (2020). Cross-sectional studies. *Chest*. 158(1S): S65–S71. doi: 10.1016/j.chest.2020.03.012.
- WHO (2024). Global tuberculosis report 2024. Geneva: World Health Organization.
- Zhou J, Yuan Q, Huang Q, Wang Q, Huang H, Chen W, Wang G, et al. (2024). Implementation factors of tuberculosis control program in primary healthcare settings in China: A mixed-methods study using the Consolidated Framework for Implementation Research. *Infect Dis Poverty*. 13(1):52. doi: 10.1186/s40249-024-01222-3.